Rockwell International

Service And Parts Manual

MODEL 24RD

1000-0439

Diagnostic Test

Keyboard Entry	Display	Comments
[CE/C]	0.	
-8.8888888	8.8888888	While entering this number, verify that all decimal points are operative across the display and that only one decimal point is on at any one time.
[=]	8.8888888	"Minus" indicator on
[+/-]	8.8888888	"Minus" indicator off
[CE/C]	0.	
12345678	12345678.	
[X]	12345678.	
90000000	90000000.	
[=]	1.1.1.1.1.1.1.0.	Overflow condition
[CE/C]	11111110.	
[X]	11111110.	
4	4.	
[=]	44444440.	
[÷]	44444440.	
2	2.	
[+]	22222220.	
8	8.	
[-]	22222228.	
6	6.	
[X]	22222222.	
5	5.	
[%]	1111111.1	

Diagnostic Test (continued)

Keyboard Entry	Display	Comments
[√‾]	1054.0925	
1	1.	
[÷]	1.	
3	3.	
[=]	0.3333333	
[M+]	0.3333333	Memory indicator on
[M+]	0.3333333	Memory indicator on
[M+]	0.3333333	Memory indicator on
[M-]	0.3333333	Memory indicator on
[MR]	0.6666666	Memory indicator on
[MC]	0.6666666	Memory indicator on
[MR]	0.	

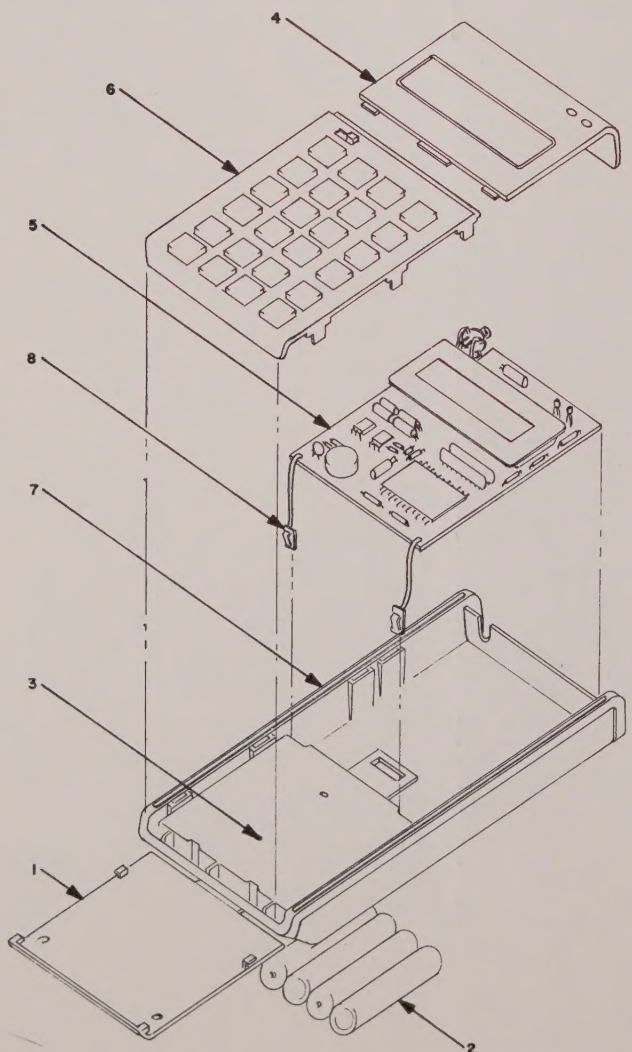
24RD ACCESSORIES

Part Number	Description
8102-4588	Gift Carton
8102-4589	Sub-Pack Master Carton
226R11-012	Instruction Manual
331R03-001	Adapter
20167H39-021	Carrying Case

24RD Top Assembly

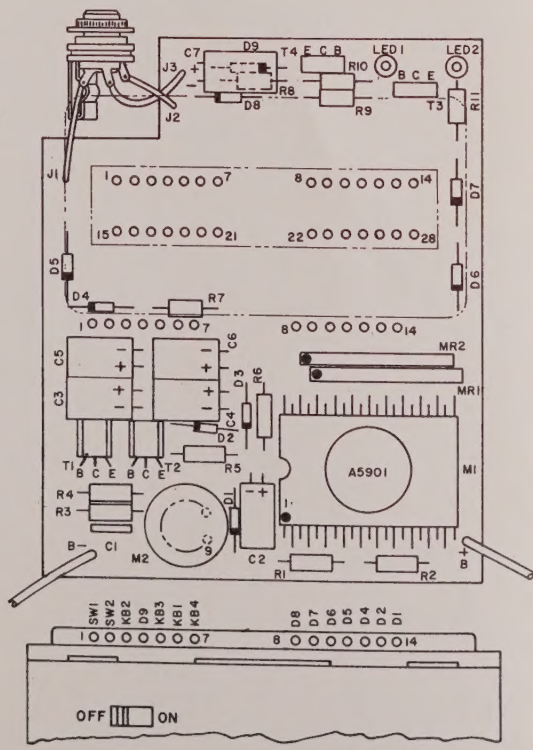
Ref. No.	Part Number	Description
1	8102-4585	Battery Cover (includes 2 rubber feet)
2	8102-4598	Batteries (AA nonrechargeable) 4 required
3	2800-0281	Screw (2 required)
4	8102-4586	Lens
5	8102-4582	Printed Circuit Board Assy. (Less Display)
6	8102-4583	Keyboard Assembly (includes bezel)
7	8102-4584	Bottom Case (includes battery terminals and 2 rubber feet)
8	8102-4596	Battery Clip Single 2 Req'd
9	8102-4597	Battery Clip Double 3 Req'd
10	8102-4587	Identification Label
11	8102-4730	Rubber Feet 4 Req'd

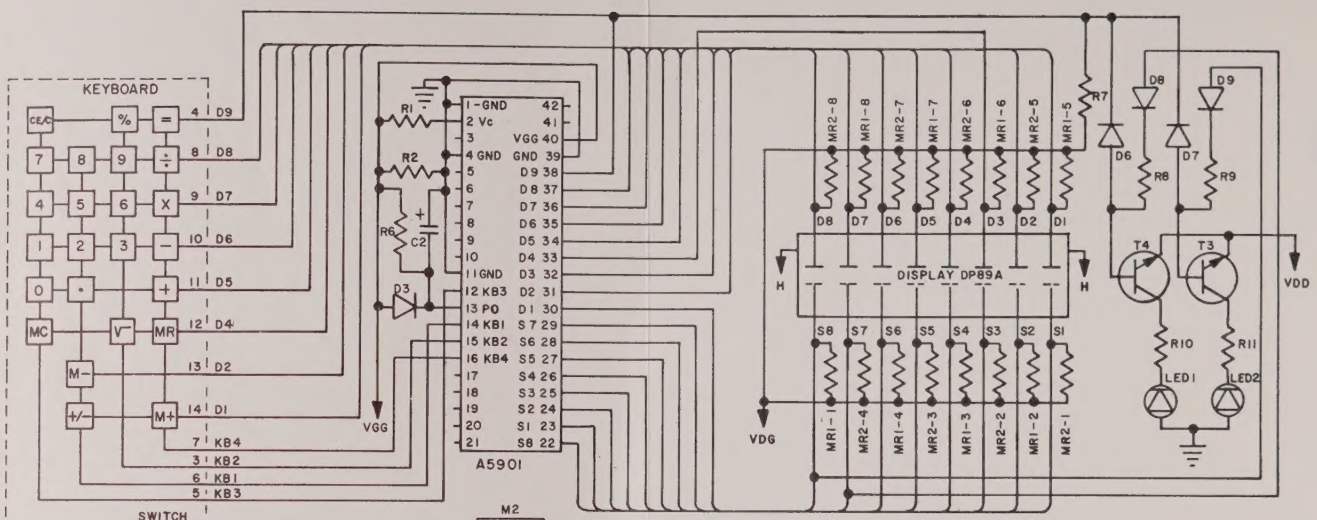
Note: Ref. No. sequence in order of disassembly, items 5 and 6 come out as an Assy.

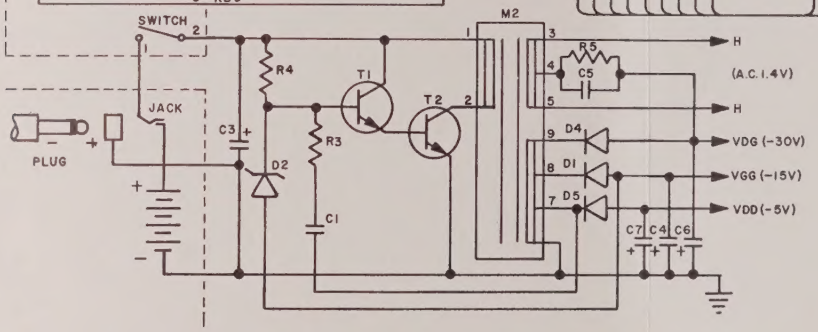


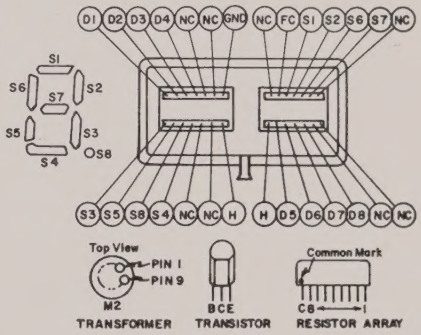
24RD LOGIC ASSY

Ref. No.	Part Number	Description
	8102-4582	Printed Circuit Board Assembly (Less Display)
	8102-4595	Printed Circuit Board (Plain)
T1, T3, T4	4800-0009	Transistor 2SC711
T2	4800-0064	Transistor 2SC1210
D1	4801-0079	Diode 1S2472
D2	4801-0076	Diode, Zener 16.5V ± 3%
D3, D4	4801-0078	Diode 1S2471
D5, D6, D7, D8, D9	4801-0080	Diode 1S2787
LED1, LED2	4801-0077	Lamp LED TLR108
R1	421R02-079	Resistor Carbon Comp 56K ohm 1/4W 5%
R2, R7, R8, R9	421R02-056	Resistor Carbon Comp 100K ohm 1/4W 10%
R3	421R02-101	Resistor Carbon Comp. 1K ohm 1/4W 5%
R4	421R02-048	Resistor Carbon Comp. 22K ohm 1/4W 10%
R5	421R02-037	Resistor Carbon Comp. 2.7K ohm 1/4W 10%
R6	421R02-075	Resistor Carbon Comp 200K ohm 1/4W 10%
R10, R11	1408-0199	Resistor Carbon Comp 43 ohms, 1/4W 5%
MR1, MR2	1408-0200	Resistor Array 150K ohm X8
C1	1502-0072	Capacitor Ceramic Disc 470PF, 50V
C2	1502-0071	Capacitor Radial Lead 0.47uf 50V
C3	1502-0068	Capacitor Radial Lead 33uf 10V
C4, C5	1502-0070	Capacitor Radial Lead 1uf, 50V
C6	1502-0069	Capacitor Radial Lead 4.7uf 50V
C7	401R01-001	Capacitor Radial Lead 10uf, 25V
M2	8102-4594	DC-DC Converter
	8102-4593	14 Pin Connector (Keyboard to PCB)
	313R09-001	Jack
M1	A5901	MOS/LSI
	209R01-001	Display
	8102-4590	Display Contact (set of 28)
	8102-4591	Display Rubber Plate









TROUBLE SHOOTING TABLE

	SYMPTOM	PROBABLE CAUSE	CHECK
1.	Display does not light.	Discharged batteries.	Check battery voltage. Should be greater than 3.2 volts.
		Defective On-Off switch.	Check switch for continuity in On position.
		Defective AC adapter jack.	Check adapter for continuity between J2 and J3.
		Defective power supply.	Check power supply circuitry.
		Defective MOS device.	Check MOS strobe signals.
		Defective display.	Check filament continuity.
2.	Dim display.	Discharged batteries.	Check battery voltage. Should be greater than 3.2 volts.
		Defective power supply.	Check power supply circuitry.
		Defective display	Replace the display.
3.	Will not clear when initially turned ON.	On-Off switch.	Check for switch bounce.
		MOS device.	Check signal at PØ for proper waveform.
4.	Random segments or decimal points missing from one or more digits.	Display	Check the display solder connections. If good, replace the display.
		MOS device.	Check segment outputs.
5.	Same segment missing from all digits.	Display.	Check the display solder connections. If good, replace the display.
		MOS device.	Check segment outputs.
		Resistor arrays.	Check MR1 and MR2 for shorts.
6.	Digits missing from the display.	Display	Check the display solder connections. If good, replace the display.
		MOS device.	Check strobe outputs.
7.	Display all 8's or random segments.	On-Off switch.	Check for intermittent condition.
		MOS device.	Turn off and check PØ at turn on.
8.	One or more keys do not enter.	Keyboard.	Check keyboard continuity.
		MOS device.	Check strobes and keyboard returns.
9.	Display will not clear.	Keyboard.	Check continuity on keyboard
		MOS device.	Check strobe 8 and KB1.
10.	Incorrect arithmetic operation (wrong answer).	MOS device.	Clear calculator and repeat operation observing each entry.
		Clock frequency.	R1
		Power supply circuitry.	D1, D2, DCT-24. Transistors T1 and T2, and R4.
11.	"Minus" or "Mem" indicator does not light.	LED's.	LED 1 or LED 2.
		Indicator circuitry.	T3, T4, D6, D7, D8, D9, R10, R11, R7.
		MOS device.	Check strobe 8, segment 7 and DP signals.
12.	"Minus" and "Mem" indicators both light when not commanded.	MOS device.	Check strobe 8 and R7.

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(8102-4582 LOGIC ASSY)

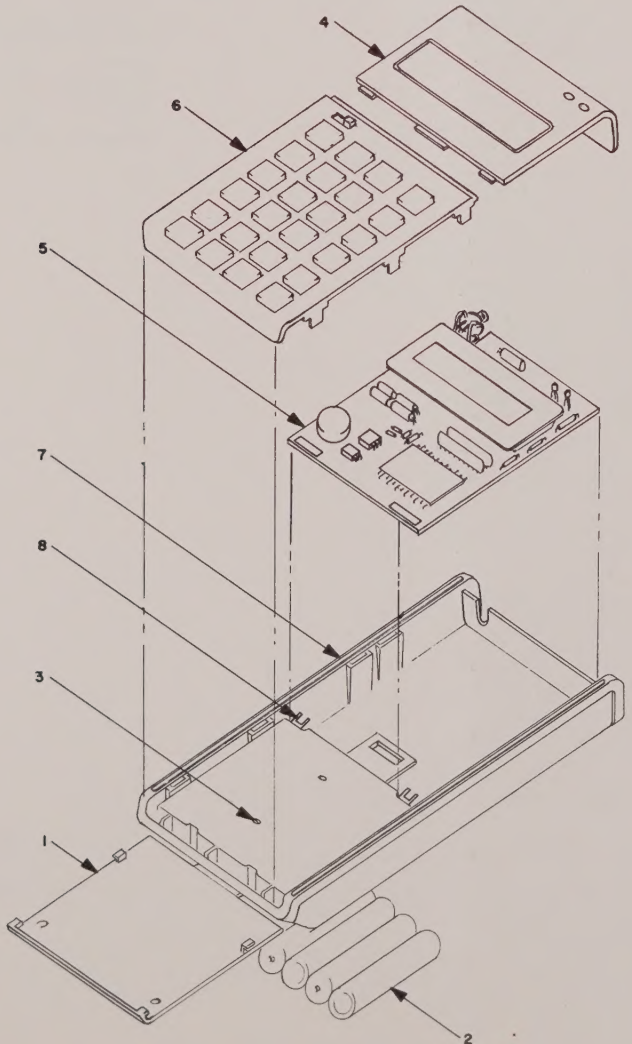
24RD ACCESSORIES

Part Number	Description
8102-4588	Gift Carton
8102-4589	Sub-Pack Master Carton
226R11-012	Instruction Manual
331R03-001	Adapter
20167H39-021	Carrying Case

24RD (Revised) Top Assembly

Ref. No.	Part Number	Description
1	8102-4585	Battery Cover (includes 2 rubber feet)
2	8102-4598	Batteries (AA nonrechargeable) 4 required
3	2800-0281	Screw (2 required)
4	8102-4586	Lens
5	8102-4792	Printed Circuit Board Assy. (Less Display)
6	8102-4583	Keyboard Assembly (includes Bezel)
7	8102-4584	Bottom Case (includes battery terminals and 2 rubber feet)
8	8102-4738	Battery Clip Single, 2 req'd (Clip Style)
9	8102-4597	Battery Clip Double, 3 req'd
10	8102-4587	Identification Label
11	8102-4730	Rubber Feet 4 req'd

Note: Ref. No. sequence in order of disassembly, items 5 and 6 come out as an assembly.



24RD (Revised) LOGIC ASSEMBLY

Ref. No.	Part Number	Description
	8102-4792	Printed Circuit Board Assembly (Less Display)
	8102-4736	Printed Circuit Board (Plain)
T1, T3, T4	4800-0009	Transistor 2SC711
T2	4800-0064	Transistor 2SC1210
D1	4801-0079	Diode 1S2472
D2	4801-0076	Diode Zener 16.5V ± 3%
D4	4801-0078	Diode 1S2471
D5, D6, D7, D8, D9	4801-0080	Diode 1S2787
LED1, LED2	4801-0077	Lamp, LED TLR108
R1	421R02-079	Resistor Carbon Comp. 56K ohm 1/4W 5%
R2	1408-0183	Resistor Carbon Comp. 30K ohm 1/4W 5%
R3	421R02-101	Resistor Carbon Comp. 1K ohm 1/4W 5%
R4	421R02-048	Resistor Carbon Comp. 22K ohm 1/4W 10%
R5	1408-0198	Resistor Carbon Comp 5K ohm 1/4W 10%
R7	421R02-056	Resistor Carbon Comp. 100K ohm 1/4W 10%
R8, R9	1408-0197	Resistor Carbon Comp 300K ohm 1/4W 10%
R10, R11	1408-0199	Resistor Carbon Comp 43 ohms 1/4W 5%
MR1, MR2	1408-0200	Resistor Array 150K ohm X8
C1	1502-0072	Capacitor Ceramic Disc 470 PF, 50V
C3	1502-0068	Capacitor Radial Lead 33uf 10V
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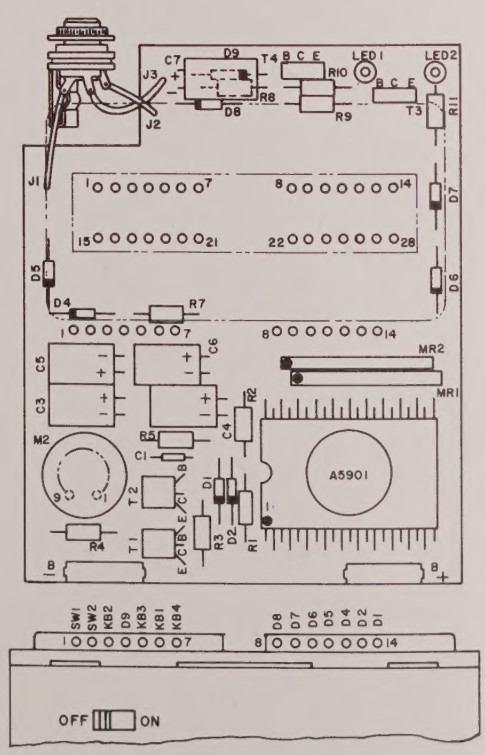
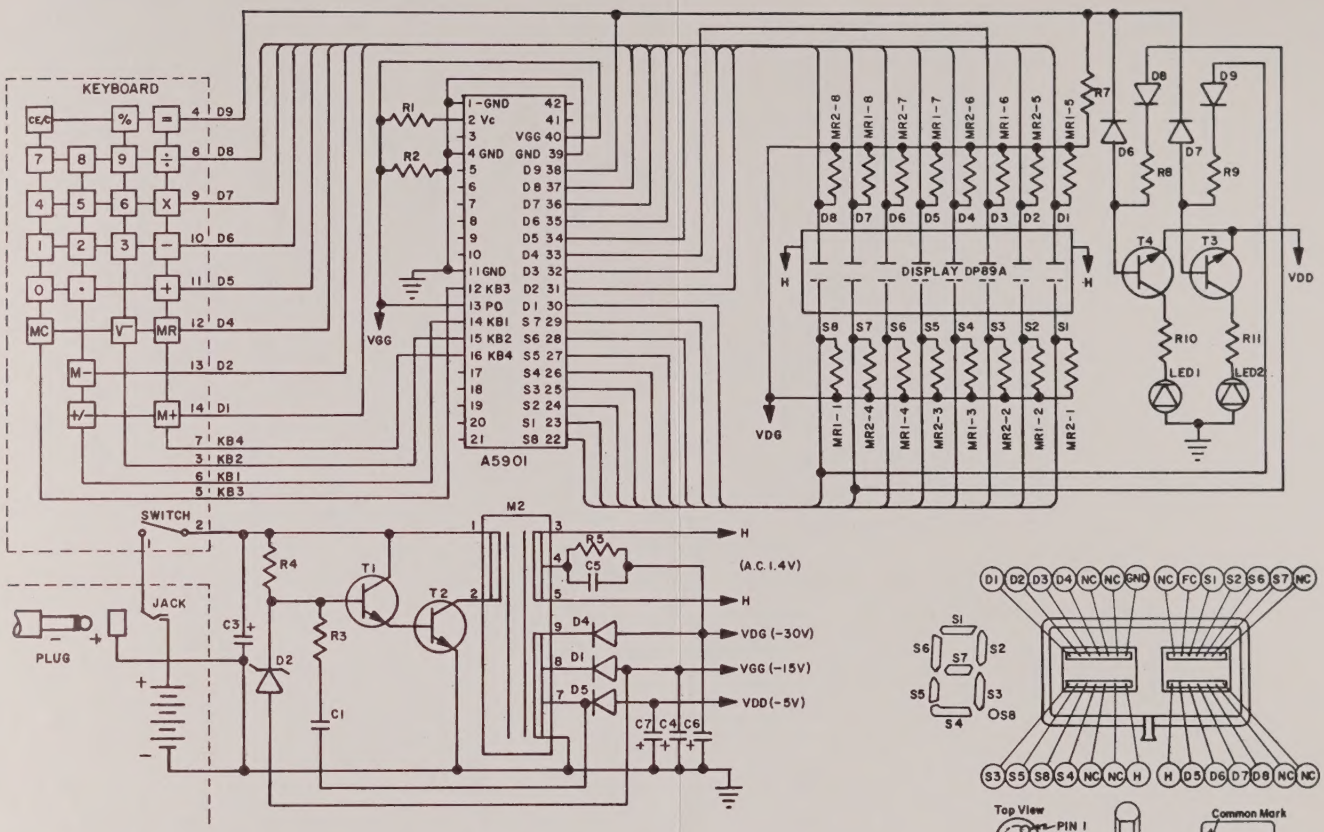
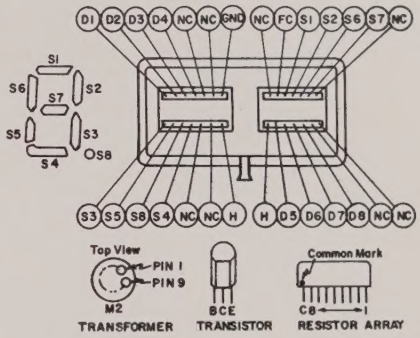
C5	1502-0070	Capacitor Radial Lead 1uf 50V
C7	401R01-001	Capacitor Radial Lead 10uf 25V
M2	8102-4594	DC-DC Converter
	8102-4737	7 Pin Connector (Keyboard to PCB)
	313R09-001	Jack
	A5901	MOS/LSI
	209R01-001	Display
	8102-4590	Display Contacts (set of 28)

Note: The following Ref. Numbers are not used on this assembly and are not shown on the schematic

D3, R6, C2 and M1







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	SYMPTOM	PROBABLE CAUSE	CHECK
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		Defective On-Off switch.	Check switch for continuity in On position.
		Defective AC adapter jack.	Check adapter for continuity between J2 and J3.
		Defective power supply.	Check power supply circuitry.
		Defective MOS device.	Check MOS strobe signals.
		Defective display.	Check filament continuity.
2.	Dim display.	Discharged batteries.	Check battery voltage. Should be greater than 3.2 volts
		Defective power supply.	Check power supply circuitry.
		Defective display	Replace the display.
3.	Will not clear when initially turned ON.	On-Off switch.	Check for switch bounce.
		MOS device.	Check signal at PØ for proper waveform.
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		MOS device.	Check strobe 8, segment 7 and DP signals.
12.	"Minus" and "Mem" indicators both light when not commanded.	MOS device.	Check strobe 8 and R7.

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(8102-4792 LOGIC ASSY)